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Building Supply Chain Resilience through Resilience Strategies and Risk Mitigation: A Study from Pakistan

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Abstract
The paper will examine the impact of some of the resilience measures on the sustainability of risk and efficiency of supply chain in tourism related supply chain in Karachi, Pakistan. It particularly talks about how these strategies have affected mitigation of risks and the performance. The paper uses the Dynamic Capability View (DCV) as the central conceptual framework to explore the relationship between the resilience strategies and sustainability risk mitigation along with supply chain resilience and supply chain performance. The analysis is done to describe the relationship of these constructs and what this would mean to managerial practice. The method used in the data collection process was the quantitative research design where a structured questionnaire was employed with a five-point Likert scale. The respondents were provided with the instrument to ascertain that the systematic and measurable data is acquired. The targeted respondents were individuals working in the supply chain of the tourism related ancillary service of the hotels, transport, and logistics. The sample consisted of diversified operations of the industry and this was achieved through the selection criterion. Pilot study was done in SPSS to determine instrument reliability. The second stage of screening of the data offered a final sample of 223 valid answers. Structural Equation Modelling (SEM) was conducted in SmartPLS, in order to test the hypothesis. The results showed that sustainable risks were mitigated by resiliency strategies, but the correlation between mitigation of sustainable risk, resiliency strategies, supply chain resiliency and supply chain performance have not been established.

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Introduction

Background

Despite the flaws, the tourism industry demonstrates a certain capacity to recover following a variety of crises and disasters through its specific flexibility in responding to both sudden and long-term changes in the surrounding (Hall et al., 2018; Luthe et al., 2014; Berbekova et al., 2021; Novelli et al., 2018). In recent scholarship, the COVID-19 pandemic caused a severe disruption to the industry and in the long run (Ntounis et al., 2022; Sigala, 2020). However, whilst other destinations will switch to localized, sustainable tourism forms as a result of COVID-19, others will revert to pre-pandemic ways (Hall et al., 2020). A variety of studies, Berbekova et al. (2021), Hall et al. (2020), Lew et al. (2020), Ntounis et al. (2022), Prayag (2020), and Sigala (2020) discusses the strategic necessity to create resilience to reduce the adverse effects of COVID-19. According to the resilience theory, which says that change is vital, organisations must be prepared to undergo these changes because it is unpredictable but occurs regularly (Butler, 2017; Cheer & Lew, 2017). Tourism businesses must be built appropriately and subsequently assisted based on their resilience as stipulated by Hall et al. (2018), to minimize vulnerability, as well as to remain active throughout the pandemic (Prayag, 2020; Sigala, 2020). Hall et al. (2020), Ntounis et al. (2022) and Price et al. (2022) also hold the same opinion.

The local and global supply chains have been under pressure due to a list of disruptions that are too long, including COVID-19 pandemic, earthquakes in Turkey, and the war in Ukraine. Even though the recent disruptions were primarily the results of the pandemic, armed conflict and earthquakes, the supply-chain disruptions can have different types in the economic, commercial, political, legislative, environmental and technological dimensions. Such global supply chain disruptions cause enormous effects on the international trade, tourism, local and international businesses, and economy (Katsaliaki et al., 2022). The existing turmoil portrays the reality that poor supply-chain resilience negatively impacts the day-to-day activities of an organization and the lives of the people around the world. In particular, absence or severe absence of supply-chain resilience exposes supply chain to failure due to their complexity. The sufficient definition of supply-chain resilience is the ability of a supply chain to reduce the risk of facing an unexpected disruption, resilient in transmitting disruptions in the chain through maintaining control of structure and functions, and reacts and responds through effective and rapid reactive strategies to overcome the disruption and restore a supply chain to a robust operation state (Kamalahmadi and Parast, 2016). According to this, it is paramount that resilient supply chains not only need to be developed, operated and maintained in a reactionary way but also in a proactive way.

Supply chain resilience and management is particularly a crucial part of the tourism domain because tourism and hospitality supply chains (THSCs) need to be coordinated and collaborate with different channel participants, including government agencies, intermediaries, service providers, subcontractors, and consumers (Zhang et al., 2016). Zhang et al. (2009) define a THSC as a system of tourism organizations that are engaged in many activities such as the provision of various parts of tourism products/services such as flights and accommodation besides marketing

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and distribution of the final tourism product in a given tourism destination though with a broad reach of players in both the private and public sector. High sophistication of a THSC makes it vulnerable to adverse factors or perturbations, which is reflected by the high extent of interdependence of the stakeholders (Berbekova et al., 2021). The nature of a THSC is determined by the interdependence of the ecological, social, economical and political factors (Gossling and Hall, 2006). This is to say that tourism is an extremely unstable system that is highly influenced by social, environmental, political and economic systems. This phenomenon improves the resilience problem that tourism sector is experiencing (Speakman, 2017; Cheer and Lew, 2017; Prayag, 2018; Reddy et al., 2020). Therefore, the construction and upkeep of resilient THSCs will prove imperative in addressing the dozens of issues that arise due to the activities that take place in these chains (Pugh, 2017).

1.1. Problem statement:

The international problems associated with tourism have been observed in the tourism industry. Over the last several decades, the field of international travel has become quite extensive in terms of the number of people who travel abroad (Shaon et al. 2024). It is this movement that has made possible the acquisition of diseases to new locations in a combination of human, genetic and environmental factors. Currently, the increase in epidemics, pandemics, and viral outbreaks is one of the most observable, adverse globalization consequences (Rahman et al. 2024). The impacts of a health crisis are radical to the tourism sector because they lead to fatalities and massive loss of money. This means that the contribution of tourism industry to the community health must be doubted. According to Urmi et al. (2024), the supply chain in such a case is supposed to be well-organized to minimize the impact of an event that threatens the public health in the tourism and leisure sector.

One of the possible causes of state revenue is tourism industry. Tourism development is among the most significant sections of the national economic strategy in Pakistan, as the country is developing (Mia et al. 2024). The tourism industry must modernize other elements of the supply chain other than the transportation and accommodation sector, which include the entertainment, events and gastronomy. According to Hossen et al. (2024), effective supply chain management is one of the means of staying competitive, and every successful company, tourism included, relies on it. The difficulty lies in meeting the expectations of the visitors and the assessments of the value to money percentage of the tourism products. According to the supply chain analyses, there could be a possibility that the tourism industry in Pakistan is a step ahead of its counterparts in the region. This is due to various reasons which may be lack of proper funds, proper facilities and poor staff. Despite being under the tender age, the industrial supply chain is potentially huge in the future. The tourism business in Pakistan is putting its attention on this issue. There should also be more studies to enhance the knowledge besides defining the strategies which can enhance the resilience in the supply chain performance (Rahman et al. 2024).

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Iftikhar et al. (2021) feel that although the supply chain resilience is extensively investigated in manufacturing industries, service industry is still under-investigated, and more research is needed. As McCool (2016) states, it is possible to promote sustainable tourism practices to make sure that the resilience of the tourism-related health supply chains (THSCs) would have been enhanced. Nevertheless, the planning and normalisation of an effective system of THSC resilience is still a debated issue despite growing tendencies in the creation of such a system (Reddy et al. 2020; Alkier et al. 2022).. The THSC resilience framework needs to be analyzed more thoroughly in order to address THSC resilience in the context of a larger scale (Reddy et al., 2020; Alkier et al., 2022). Even though some studies have already offered theoretical justifications to construct resilient THSCs (Jang et al., 2022), the authors do not know of any other tourism literature that shows a holistic framework of defining driving and restraining forces (DFs and RFs) of resilient THSCs.

1.2. Research Objective:

This study examines how resilience strategies are used to deal with sustainability risk in supply chains in Pakistan. Other significant consideration would be the effect the resilience strategies have on the performance of the entire supply chain and the effects the risk of sustainability being eliminated have on the performance. The other secondary objectives of the study are to increase the knowledge about the positive contribution of supply chain resilience to the performance outcomes. These goals are all aimed at improving the knowledge on how developing nations can make their supply chains stronger and more effective.

1.3. Research Question:

- How do the sustainability issues in Pakistani supply chains potentially be reduced through resilience strategies?
- What happens in cases where sustainability considerations are ignored, as far as the supply chain performance is concerned?
- How do the strategies of supply chain performance and resilience interact directly?
- How does a supply chain resilience impact the overall performance of the supply chain

1.4. Significance of the study

Karachi is considered as the largest commercial center and industrial city in Pakistan, and this research may be of interest to the scholars and professionals in supply chain management of this area. It offers manufacturing firms, logistics service suppliers in Karachi practical measures to enhance supply-chain performance through establishment of strong and flexible supply chains to overcome the risks posed by sustainability and supply chain disruption, strict regulation, and unclear uncertainty about the eco-environment. This research will provide supply chain managers and practitioners with solutions to enhance the operational predictability and remain competitive in the volatile business environment.

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The results of the present research may be applicable to the national and regional policy-makers and governments to formulate supply chains and risk-avertive policies. The research fills the gaps in the scanty empirical evidence on supply chain resilience and sustainability risks mitigation in developing nations, particularly, Pakistan. The proposed methodology and the empirical data may be used as a basis of further research which will be helpful to both scholars and postgraduates. Lastly, this research also enables evidence-based development of strategies to build effective and strong supply chains within Karachi.

1.5. Scope of the thesis:

This thesis evaluates several of the organizations in Karachi, Pakistan with respect to the supply chain, in the aspects of performance, flexible sustaining strategies, sustainability risk management and the overall resilience of the supply chain. The research examines different areas, and every one of them is important to the supply chain network of the city. These areas are the Karachi transport, Karachi logistics and accommodation, among others. Only logistics, sales and supply chain managers among other top managers in the company were involved in gleaning information. The applicability of the study may also be restricted because Karachi was very geographically constrained and the results would not be relevant in other urban and regional environments in Pakistan. The investigation is constrained by the proposed hypotheses and identified dependent and independent variables, therefore all the macroeconomic or political factors are eliminated. The resulting data are recorded to a limited time window and record the perceptions of respondents at a particular time of the space and time.

2. Literature Review

Theoretical Background

Dynamic Capability View Theory

According to Teece et al. (1997) and Eisenhardt and Martin (2000), the Dynamic Capabilities View (DCV) has its foundation on the competence of firms to adapt to change and uncertainty within the environments through incorporating, creating, and re-engineering organizational resources through the firm processes. This capability will enable it to come up with innovative projects that will add value to the organization. We hold the position that corporate supply chains must be resilient in competencies of withstanding the uncertainty and creation of dynamic capacities so as to diminish the vulnerabilities. The DCV offers a solid base of outlining the proactive and responsive abilities of supply chain resilience (Teece et al., 1997). In order to adjust to the changing fast markets, the firms founded on the DCV must include, reorganize and reallocate resources and capabilities. The dynamic nature of the supply chain to respond to the changes in the environment as well as the minimization of the susceptibility of the supply chain to vulnerability is directly linked to the extent to which the organizations can actively monitor their environment and develop the necessary flexibility and capability to adapt quickly to the environmental fluctuations (Teece et al., 1997). The DCV assumes that in the event of uncertainty,

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the market leaders must be in a position to reorganize its resources and capabilities in real time to restore its competencies (Teece et al., 1997). We assert that the supply chains should be responsive to realign their resources and capabilities to recover fast after disruptions. According to Pettit et al. (2013, pp. 47), the concept of balanced resilience is defined as a state where it is possible to augment defenses and spend more resources to fix security vulnerabilities. According to the DCV, Ponomarov and Holcomb (2009) assert that resource and capability specialization is essential along with effective monitoring in order to be able to sustain profitability through enhanced resilience balance.

2.1. Hypothesis Development

The benefits of implementing a resilient approach in alleviating the sustainability-related risks in the supply chain have also been noted in the course of past researches. As an example, Christopher and Peck (2004) and Sheffi and Rice (2005) observe that, operational redundancy and operational flexibility as sustainable constructs and management of the operational risk, collaboration and transparency forms a type of resilience within the spectrum of social, environmental and operational risk. According to Sheffi and Rice (2005), operationally resilient supply chains can overcome the risks aforementioned. On the other hand, Ponomarov and Holcomb (2009) hold that supply chains that are resilient to sustain risks, mitigate the effects of demand variability, supply disruptions and the (de)regulation changes or the introduction of new (or different) regulations. Wieland and Wallenburg (2013) indicate that among the various resilience abilities, adaptive and collaborative ones, in particular, reduce the risk exposure to sustainability issues the most. In addition, Scholten, Scott and Fynes (2014) hold that the mentioned factors that characterize the responsiveness and variability characterize the enhancement in sustainable performance. It is these authors that the resilience strategies began to offer the explanation of the integration of the sustainability concerns with mitigating the risks, and finding the balance (Brandon-Jones et al, 2014; Ivanov, 2020).

H1: The strategies of resilience positively affect the negation of sustainability risks.

Among many of the points of view described in the articles, one of them is that the performance of the supply chain is, in fact, enhanced when the managers are worried about the risk to the sustainability of the performance. It addresses itself to operational predictability, operational efficiency and long term sustaining competitive advantage of the firm. Supply chain and cost are concerned with the negative and unsustainable in the social, resource, and regulatory components of the environment (Carter and Rogers, 2008). The most positive aspects that an organization seeks to realize are uncertainty, reliability, service level and performance (Seuring and Muller, 2008). According to Pagell and Wu (2009), risk management improves operational and financial performance of the supply chains with respect to sustainability. According to Gualandris, Klassen, Vachon, and Kalchschmidt (2015), the cause of improvement of the supply chain responsiveness and resilience is explained by the fact that the management of sustainability-related disruption enhances it. According to Zsidisin and Ritchie (2009) and Awaysheh and Klassen (2010), in any case, the absence of sustainability risk management can be mitigated, more cost savings are a

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positive factor, the company is better placed, and the stakeholders are more trustful, the supply chain performance is improved.

H2: Sustainability risk negation positively influences the supply chain performance.

The strategies of resilience improve the supply chain performance. Companies can provide even more services and be effective. The disruptions are addressed effectively. Agility, flexibility, collaboration and transparency are also recorded qualities of Sheffi and Rice (2005) and Christopher and Peck (2004) as significant to supply chains responsiveness to an event when operational continuity is paramount. According to Ponomarov and Holcomb (2009), supply chains are fast, reliable and are recovering. According to Wieland and Wallenburg (2013), the performance of an enterprise in terms of delivery, cost and customer satisfaction is enhanced in the presence of proactive resilient strategies. Brandon-Jones et al. (2014) report a positive effect in the performance in high uncertainty and volatility using the resilient oriented competencies. The adaptive resilience strategies of short run have been recorded to positively impact the outlook of long run environmental performance in Ivanov and Dolgui (2020).

H3: Resilience strategies positively affect performance of supply chains.

SCR is the ability of supply chains to adjust and survive in the challenge (Brandon-Jones et al., 2014). The value and satisfaction of the end users is enhanced and contributes to the rapid recovery of the shocks; therefore, the uncertainties in the process of the supply of materials and the distribution of products are minimized (Singh et al., 2020; Chowdhury and Quaddus, 2017). According to Bakshi and Kleindorfer (2009), strong supply chains bring in cooperation and coordination on different levels of the supply chain. According to Gu et al. (2021), Huo et al. (2014), and Tarafdar and Qrunfleh (2017), SCP is a parameter used to measure how successful a supply chain is in delivering deliverables to the end customers within the stipulated time. Constant supply of materials is critical in order to accomplish the functions of manufacturing and customer service. The supply chain movement and fulfillment of the customers needs are also anchored by the regularity of the deliveries of the products by the suppliers (Hamidu et al., 2023). To some extent, supply chain resilience allows the core company and the whole supply chain to continue operations when the competitors have stopped operating (Shen et al., 2023). SCR is able to avoid the adverse events, and, conversely, it can create as well as maintain the optimal performance levels as a highly essential promoter of SCP (Chowdhury et al., 2019; Juttenberg and Maklan, 2011). Recently, it has been proven that supply chain resilience (SCR) positively affects supply chain performance (SCP) (Chowdhury and Quaddus, 2017). SCP has to be improved through the improvement of SCR (Gu et al., 2021).

H4: Supply chain resilience positively influences the performance of the supply chain.

2.2. Conceptual Framework

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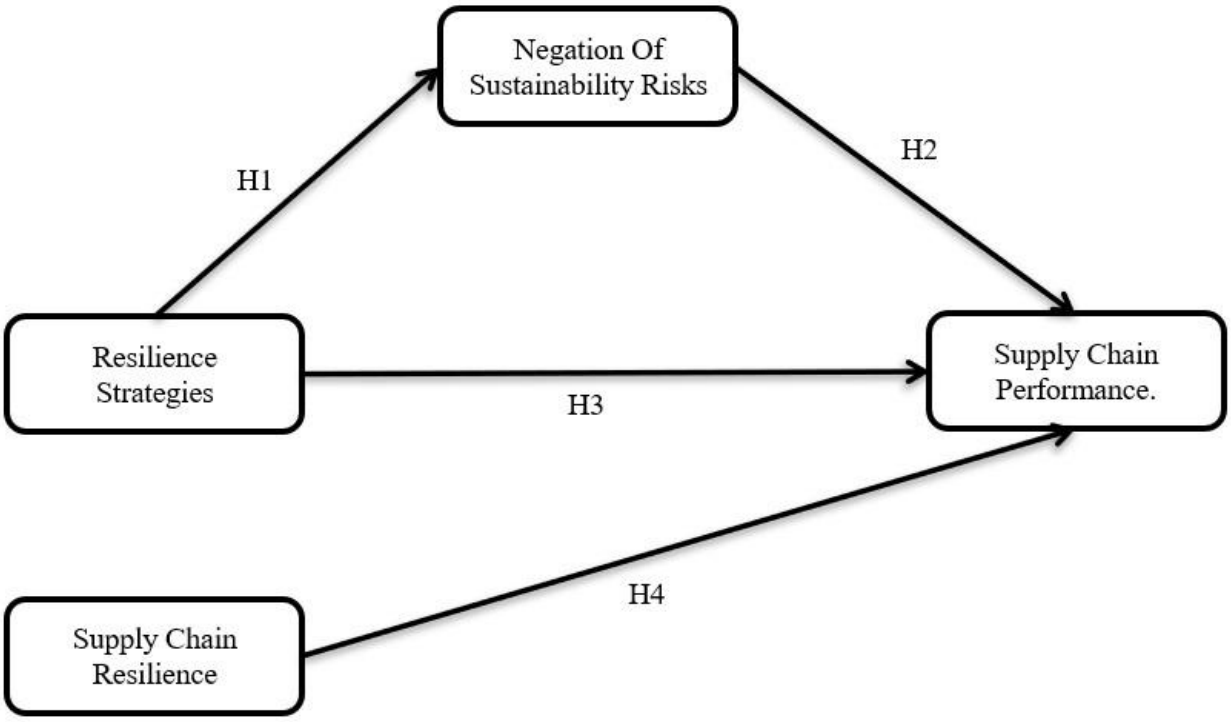

2.3. Empirical Reviews

The article by Shaon et al. (2024) examines the lessons learned in the COVID19 pandemic, in which resiliency in the supply chain and executive support are discussed, along with open communication. Tourism industry is exposed to international risks because of its international nature. It has a combination of both environmental and genetic and anthropogenic determinants that influence the transmission of disease hence to international travelers. The negative aspects of globalization showed through increased cases of outbreak, epidemics and pandemics resulting as a consequence of viruses. These events are disastrous within the tourism industry resulting in loss of life and even economic stagnation of mammoth proportional magnitude. Numerous tourism-related companies were severely affected by the need to survive during the COVID-19 crisis due to the unprecedented and extended threats. This demonstrates the necessity to carry out further studies on the drivers of or enhancers of supply-chain resilience. In such circumstances, the safety of the overall health of the tourists turns into an emergency. The paper seeks to discuss tourism management regarding the effects of the communication, organisational culture, and senior-

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management support on the supply-chain resilience. The primary objective will be to explore the impact of the supply-chain resilience on performance and how it relates with communication, organisational culture and the leadership support. To analyse such relationships data were collected on 128 organisational units in tourism industry that had 93 male and 35 female respondents. The SPSS 23 and SmartPLS that are both structural-equation-modelling programs were used to process the data. The findings indicate that executive support, proper communication, and organisational culture play a major role in fostering supply-chain resilience in tourism. The stronger the supply chains of companies working in the tourism industry, the more successfully they work. The tourism and leisure industry can also supply chain to enhance the health and safety of the visitors.

Choong et al. (2024) analysed how to establish a superior adaptability, intra-chain cooperation and strategic human-resource management within small and medium tourism enterprises. SMEs constitute a significant component of the global economy particularly in the travel and hospitality sectors. They are however susceptible to external interferences which is quite difficult. These authors proposed a model that tries to enhance the resilience of the SMEs through the assistance of supply-chain partnership, strategic human-resource management, and adapting capability. The model relies on seven propositions that were developed on the premise of the Dynamic Capability Theory. The survey was done in Malaysia, 210 SME managers and owners completed the survey. The results of the acquired data were processed with using the latest version of SmartPLS. The results suggest that collaborative practices and human-resource development have to be promoted in order to develop resilience in tourism SMEs. The study bridges a research gap of the small and medium tourism businesses and offers data regarding disaster preparedness to enable the SMEs to become more resilient.

Neuhofer et al. (2024) provided an extensive review of the aspects which influence the resilience of the supply chains within the travel and hospitality industry. Failure of the supply system in a manner that is not resilient to failure is detrimental to the global economy. Tourism and hospitality is also susceptible to being disrupted naturally by its complexity and the situation is only aggravated by lack of or poor resilience in the supply-chain. The significance of the subject does not weaken the reality that the literature available lacks a comprehensive study of how the tourism and hospitality supply chains (THSCs) can be improved. The primary objective of research is to provide an elaborate discussion of the promoting and restraining factors to determine the emergence of robust THSCs. The paper outlines a decision model, which is a synthesis of RIVN-ISM-MICMAC approach and rough interval valued neutrosophic (RIVN) force- field theory of change. According to those findings, poor legislation and incentives and ineffective organisation and supply-chain management policies are the largest barriers to making THSCs more resilient.

Chowdhury et al. (2024) have examined the measures of enhancing the sustainability of tourism in order to minimize the consequences of radical disruption. The article examines the optimal resilience plan that organizations need to implement to attain sustainable performance in the tourism supply chain in the event of extreme disruptive events that affect the entire supply chain. It employs the dynamic capability viewpoint (DCV). Various approaches are employed in the

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research. In the first place, the scope of the interviews conducted in Study 1 was enormous to identify the potential obstacles to sustainability of tourism supply chain and how they can be addressed. The second paper identified the most essential resilience strategies to extreme catastrophes using the quality function deployment (QFD) technique. Study 3 used fuzzy set qualitative comparative analysis (fsQCA) in order to determine the best combination of resilience strategies and risks to sustainable performance in the tourism supply chain. The findings indicate that the performance of sustainable tourism in case of a large scale disruptive event such as the COVID-19 pandemic relies on the interconnection of risks and resilience strategies but not on each of the elements separately. The study has significant implications on the management practice in its conclusions. Managers can test a number of resilience strategies and factors to achieve the required results. The research offers data to the managers in their effort to mitigate risks and sustain performance in case a significant disruptive event takes place, therefore contributing to the previous knowledge on tourism supply chain.

The analysis of COVID-19 supply chain vulnerability and resilience during the period of uncertainty is based on the case of Lijiang in the article by Bai and Ran (2022). The COVID-19 resulted in severe losses to the tourism industry by generating the feeling of uncertainty that disrupted the original hierarchy network and the entire supply-and-demand model of the tourism supply chain (TSC). The analysis involved case studies and consensual qualitative research (CQR) approaches to analyze the key concepts of vulnerability and resilience of the TSC. The real-life scenario and perception of the individual participants of the supply-chain were used in the study as a prism, which was complemented by the narrative incursion of Lijiang Yulong Tourism Co.Ltd, Lijiang Old Town and the Yulong Snow Mountain scenic sites. The information that has been given since the onset of the pandemic indicates that the TSC has been derailed and compromised by forces related to supply, demand, government, economic structure of the destination, and supply-chain factors. Meanwhile, the Chinese economic situation has such powerful elements as the tourism demand side, the supply side, the governmental factors and the market players. It is based on the vulnerability that emerge possibilities of growth, transformation and innovation. There is revival tendency in the revival of growth in the TSC. It is observed that the study augments TSC and emergency crisis supply-chain management development as a theoretical framework. The behavioural reaction of the participants with different degrees of supply chain to the different degrees of supply chain enables generation of TSC risk management strategies and future optimisation strategies as long as the goals of sustainable development in the fluctuating tourist industry are fulfilled.

Mittal and Sinha (2022) addressed the risk-management plan that can be used once the pandemic is over to establish the powerful religious tourism supply chain. The religious tourism supply chain in the present paper is examined with the aim of mitigating the effects of disruption following the pandemic, generalizing its weaknesses and recommendations on how it can be enhanced. The gaps in the existing literature about religious tourism are bridged by the report that contains a literature review. This sector generates much income to India but there is a slight movement on the academic

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side. To address the gap, the authors have come up with a theoretical framework of the religious tourism supply chain, which in turn guided the study objectives and research questions. The opportunities and threats of this industry were demonstrated by the supply chain of religious tourism which was long-established being a part of a number of catastrophes. Companies, government agencies, and states were ordered to negotiate post-reopening operating rules to this supply chain following the long closure of places of worship due to COVID19. The conceptualisation enabled the authors to develop a system that permits free flow of services and individuals within the supply chain. The proposed structure needs the collaboration of all the stakeholders at every level to actualise the proposals. To learn about the sustainability of religious tourism in terms of supply chain, several precautions have been proposed to minimise disruptions. The COVID-19 pandemic disrupted the economy of the world and disrupted the supply chains. The essay relates how humanitarian supply chains should be more resilient by making coordinated and incremental actions to alleviate disaster effects. The reader will appreciate such systematic attempts since the necessity to possess resiliency in the whole chain of religion tourism supply chain. The study will help to identify methods of becoming more resilient in order to minimize the disruption of the disaster and overcome post-pandemic problems in the religious tourism supply chain.

Research Methodology

3.1. Methodology

Our analysis of research methodology has been done in detail. The subsequent sections are a complete description of the methodology of the study which includes the design of the study, data collection and sampling processes and target population. It does not matter the research method, be it quantitative, qualitative or a combination of both. In contrast to quantitative research designs, which rely on the pre-existing survey instruments, a qualitative study may rely on in-depth interviews, participant observation, and open-ended questionnaires. A mixed-methods method is applied when either a quantitative or a qualitative approach is not sufficient to solve a study problem (Sekaran and Bougie, 2016). The information that was gathered in this query was evaluated through a quantitative method. To be considered quantitative, research needs to state the data used and analyzed. The quantitative method makes theoretical inquiry and practical evaluation of ideas much more effective.

This study falls under the explanatory category and aims at analyzing and evaluating the existing correlation between the two elements (Creswell, 2014). This study has been conducted within a natural setting or non-manipulated study environment to the extent that the researcher did not control the conditions under which the subjects had to operate or run studies (Sekaran & Bougie, 2016).

According to Sekaran and Bougie (2016), the amount of data collected during the phases of information research can be defined as the analysis of units. Individual data points in this study were responses of each participant.

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3.2. Target Population

This study is carried out among the staff working at the supply chains of the hotels, transport companies, logistics and other services in Karachi, Pakistan. The respondents are male and female of various segments of between 15 to 31 years. The managers and executives within the tourism industry who oversee and implement various supply chain processes such as logistics, sales and other operations are the other participants of the study. The respondents possess varied durations of service of less than a year and over ten years and this gives a wide range of theoretical and practical empirical knowledge and competencies in various sectors. We have also included tourism companies of various categories regarding size which comprise 1-100, 101-500, and more than 500 employees to obtain various organizational perceptions towards the resilience and performance of tourism industry supply chains.

3.3. Data Collection Technique

In a survey research, the respondents are often measured on a Five-point Likert scale to assess their attitudes and perceptions (Chandel et al., 2015).

1: Strongly disagree, 2: disagree, 3: neutral, 4: agree, 5: strongly agree.

3.4. Sampling Technique

The selectors of the study volunteers employed non-probability sampling, specifically, purposeful sample selection. Sekaran and Bougie (2016) emphasize the value of making such a diverse array of people included in order to ensure that a sample is reflective of the rest of the population. Researchers adopt the approach of non-probability sampling in cases where they do not have sufficient information about the population they are studying in order to apply the probability sampling techniques (Sekaran & Bougie, 2016)

3.5. Statistical Technique

In the research, the PLS-SEM model applied in the SMART PLS programme is used to carry out hypothesis testing. To carry out SEM-based research, PLS-SEM is generated due to the tremendous growth it provides (Hair et al., 2011). Its versatility as a modelling language both of variables and combinations has seen it picked up by researchers in a wide range of activities, and it has also found applicability in the predictive sense (Henseler et al., 2016). In contrast to the parametric statistical model, PLS SEM can be applied to the non-normally distributed data (Hair Jr. et al., 2014).

3.6. Ethical Consideration

Moral philosophy is said to be ethical when a person or organization will abide by the rules of moral philosophy, which are, doing the right thing, possessing good character, and possessing moral ideals. Conversely, recognition, understanding and contemplation are part of consideration. Therefore, research ethics involve discussion and consideration of moral values, factual achievements and moral directives to which all participants and researchers need to adhere. The current research adhered to the standards of ethics to safeguard the rights and integrity of all the subjects and to avoid distortion of the outcomes. The students (undergraduates, graduates and postgraduates) in Karachi were informed of what was going to be achieved by the study before

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administering the structured questionnaire to them and that the information would never be used against them. They simply participated because they pleased. We were certain that we could not trace down the comments made to specific participants since we did not request that they provide any personal details. We kept and viewed the data jointly as well to prevent misuse by any individual hence keeping anonymity and privacy. Moreover, participants were allowed to withdraw out of the research at will and every precaution was taken to ensure that they did not experience any academic, social and psychological handicap in the aftermath of their participation. Tracing the principles of openness, honesty, and respect in the process of data collection assists in maintaining academic integrity and providing objective findings.

Data Analysis

4.1 Reliability (Pilot Study)

Pilot study was carried out to determine the reliability of the questionnaire and 50 participants were used. A positive value of Cronbach alpha of 0.7 or more is an indicator of internal consistency. To obtain more detail, the work by Hair et al. was analyzed and validated with IBM SPSS 22. Every independent variable was allocated a probability of 0.7 and above. Table 4.1 illustrates the outcome of our reliability test.

Table 4.1

Reliability Analysis

	No. of items	**Cronbach's alpha**
RS	16	0.951
NSR	14	0.794
SCP	5	0.880
SCR	5	0.836
Overall	**40**	**0.917**

4.2 Data Screening

Descriptive statistics can be inferred when they prove to be reliable. The general advice Kumar (2015) provides is to conduct a set of tests such as removing the outlier data and the system of missing values before running structural equation modeling (SEM) on the data. The dataset used to conduct this investigation does not contain very high- or very low values.

4.2.1. Missing Values Analysis

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Missing or incomplete data may greatly affect data analysis process. Kaiser (2014) notes that missing data needed to be factored in since there was a high likelihood of making serious mistakes in research. Since the results of SEM analysis are stable and there were no outliers in this case, additional research is needed to address such non values (Kumar, 2015).

4.2.2. Outliers

An outlier refers to data that is far apart in an analogy of similar data in a statistical sample. The initial step in empirical testing of hypotheses is to recognize and evaluate a set of differences or discrepancies. You should remove outliers because when you have a sample it is not the underlying values that you really have, there is always a sampling error (and there is human error that comes with that fact (Ghosh & Vogt 2012). The rest of the respondents were 223 after this.

4.3. Analysis

We used another method to simulate the action of the pertinent parameters against Likert scale section. Hair et al. (2011) put forward Partial Least Squares Structural Equation Modelling (PLS-SEM) that worked well in solving complex modeling problems particularly where data were in experimental form. In the current research, the overall model is applied to justify such underlying causes by introducing mediators and informed bias types. This complex structure can be analyzed and predicted with the help of PLS-SEM and SmartPLS 4. A case in point is an educative case study by Ringle, Silvia, and Bido (2015). The first step that SmartPLS undertook was to explore the different ways of data collection and the quantity of work per individual indicator would take. The external model can not be of any use without a thorough study of the test relationships.

4.4. Outer Model

One can estimate the DV of the external model in a number of ways, including CR, AVE, and LCV. The definition of the conceptualization of HTMT as presented by Henseler, Ringle, and Sarstedt (2015) can be strengthened in comparison with the concept definition in the literature on domestic violence that is presented in Fornell and Larcker (1981). Three independent methods in this study were carried out to evaluate the overall composite reliability of each external simulator. Hair et al. (2010) suggest that any regression coefficients estimated to be above 0.65 should be maintained. Hence, this rule was followed in our analysis. As indicated in table 4.3, majority of the alpha values are above 0.65. According to Hair, Ringle and Sarstedt (2011), the lowest requirement of composite reliability (CR) is 0.7. Therefore, before calculating the overall correlation coefficients, we ensured that there was sufficient variance of the sub-factors of each of the dependent variables in the groups of nature.

Retrieves of mean-differences were used to test the correspondence of the latent factors. Hair et al. they contend that AVE score of 0.5 or above is significant, to be accepted by academics.

Table 4.3 *Outer Loading*

	NSR	RS	SCP	SCR
NSR1	0.886			

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NSR2	0.877			
NSR3	0.863			
NSR4	0.773			
NSR5	0.792			
RS10		0.755		
RS11		0.707		
RS12		0.807		
RS13		0.790		
RS14		0.824		
RS15		0.772		
RS16		0.796		
RS2		0.855		
RS4		0.795		
RS5		0.705		
RS7		0.747		
RS8		0.964		
RS9		0.852		
SCP1			0.812	
SCP2			0.765	
SCP3			0.872	
SCP4			0.826	
SCR1				0.818
SCR2				0.838
SCR3				0.880
SCR4				0.872
SCR5				0.769

4.4.1. Convergent Validity Analysis

The effectiveness of the outer model could be measured in a number of ways including: DV, AVE and CR. One observation associated with the HTMT ratio is that it can be of interest to compare the measure suggested by Henseler, Ringle and Sarstedt with the Fornell and Larcker (1981) standard. The professional assessed all the three estimation processes and then selected which one was to be subjected to a more detailed examination. Hair et al. (2011) confirmed their hypothesis by confirming that the factor loadings were greater than 0.65.

To get a CR value bigger or equal to the cut-off of 0.7, Hair, Ringle, and Sarstedt (2011) believe that at least all the variables must be captured appropriately by the substructure.

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Table 4.3 Convergent Validity

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
NSR	0.877	0.885	0.912	0.675
RS	0.925	0.935	0.935	0.526
SCP	0.842	0.895	0.891	0.672
SCR	0.895	0.972	0.921	0.699

Note: CR = Composite Reliability, AVE = Average Variance Extracted

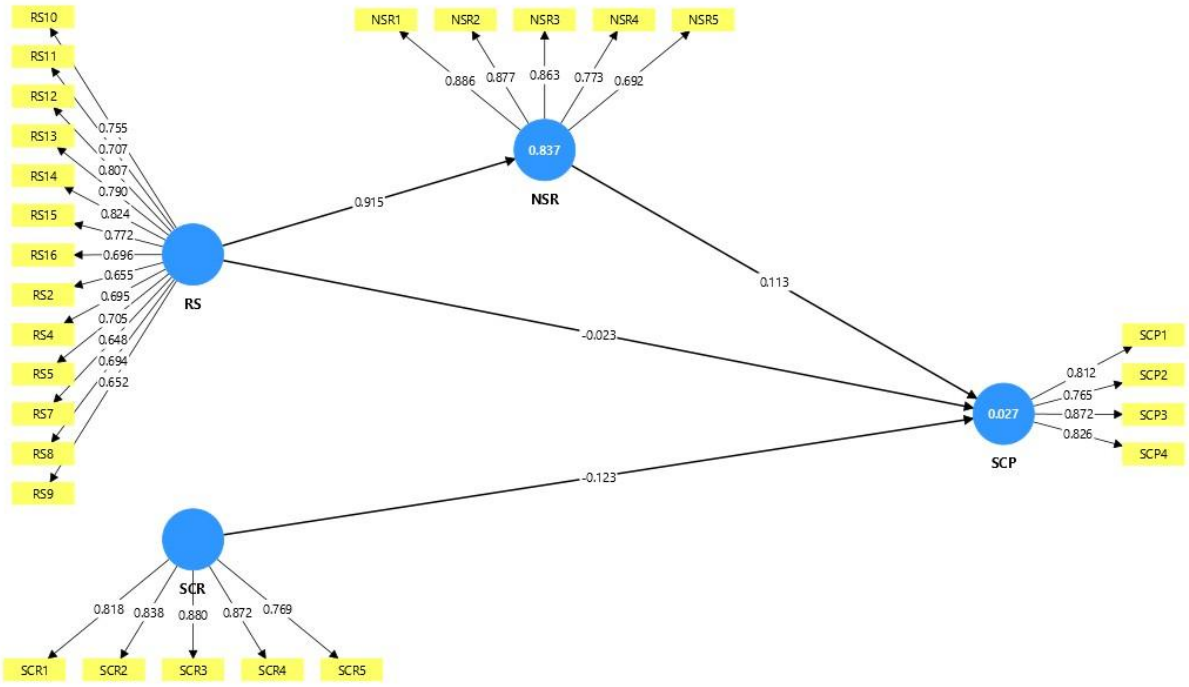

Figure 4.1 *Measurement of Outer Model*

4.4.2. Discriminant Validity Analysis

By applying the standards of validity, the researchers can discard any causal relationships of independent and dependent variables which is essential in the field of scientific research.

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Predictability aspects can be considered individually. The estimations were obtained by a number of methodologies. The study conducted by Fornell and Larcker in 1981 was an innovative attempt that had never been studied before. Cloud loadings are a second issue which is worth all our attention. Merging similar or different aspects. According to Kumar (2015), when relying on Pearson Product-Moment Multiplier (HTMT), the mean square root value should be positive when a row or a column of the table contains values that are higher than its diagonal elements. The tables that follow are a representation of correlation coefficients of several components, which identify the relative importance of the factors in understanding the data.

Table 4.3
Discriminant Validity by using Fornell and Larcker (1981) criterion

	NSR	RS	SCP	SCR
NSR	0.822			
RS	0.195	0.725		
SCP	0.112	0.102	0.820	
SCR	-0.163	-0.170	-0.137	0.836

Table 4.4
Cross-loadings

	NSR	RS	SCP	SCR
NSR1	0.886	0.089	0.088	-0.163
NSR2	0.877	0.178	0.094	-0.190
NSR3	0.863	0.180	0.148	-0.191
NSR4	0.773	0.369	0.167	-0.098
NSR5	0.692	0.369	-0.051	-0.002
RS10	0.602	0.755	0.154	-0.171
RS11	0.539	0.707	0.051	-0.128
RS12	0.842	0.807	0.057	-0.135
RS13	0.845	0.790	0.110	-0.185
RS14	0.837	0.824	0.119	-0.166
RS15	0.721	0.772	0.139	-0.132
RS16	0.553	0.696	0.085	-0.124
RS2	0.523	0.655	-0.005	-0.080
RS4	0.706	0.695	0.093	0.023
RS5	0.678	0.705	-0.037	-0.049
RS7	0.540	0.648	0.093	-0.184

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RS8	0.511	0.694	-0.018	-0.147
RS9	0.489	0.652	0.071	-0.128
SCP1	0.078	0.064	0.812	-0.066
SCP2	0.085	0.062	0.765	-0.094
SCP3	0.137	0.138	0.872	-0.142
SCP4	0.043	0.039	0.826	-0.126
SCR1	-0.139	-0.148	-0.105	0.818
SCR2	-0.197	-0.237	-0.089	0.838
SCR3	-0.124	-0.110	-0.167	0.880
SCR4	-0.144	-0.159	-0.094	0.872
SCR5	-0.085	-0.080	-0.073	0.769

Those estimates whose thresholds are less than 0.85 should be checked using the Heterotrait-Monotrait (HTMT) criterion of discriminant validity proposed by Henseler et al. (2015).

Table 4.5 *Heterotrait-Monotrait Ratio (HTMT)*

	NSR	RS	SCP	SCR
NSR				
RS	0.289			
SCP	0.151	0.128		
SCR	0.189	0.201	0.138	

4.5. Inner model and Hypothesis Testing

It is a common practice to use SMART-bootstrapping PLS to evaluate routes. This method creates models of prediction based on sample data, which usually comprise 5,000 items. In this research, route analysis was used to test its assumptions regarding the interrelationship between the variables at the 5% and 0.05 levels of significance. The route analysis results supported all the ideas found statistically significant correlations between nodes ($p < 0.05$; see table 4.6).

Table 4.6 *Path Analysis*

	Sample mean	Standard deviation	T statistics	P values
NSR -> SCP	0.121	0.190	0.597	0.550
RS -> NSR	0.916	0.011	86.565	0.000

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RS -> SCP	-0.030	0.192	0.119	0.905
SCR -> SCP	-0.147	0.070	1.747	0.081

4.6. Predictive Relevance of the Model

One of the ways in which the effectiveness of a model can be evaluated is through the accuracy of the prediction of a model (Hair et al., 2010). The coefficient of determination (R 2) is used by statisticians in order to determine the level of correlation between two independent variables.

Table 4.7 *Predictive Quality Indicators of the Model*

	R-square	R-square adjusted
NSR	0.837	0.836
SCP	0.027	0.014

4.7. Discussion

The statistical test makes us conclude that the hypothesis that sustainability risks mitigation is associated with the increased supply chain performance does not have any evidence ($p = 0.550$; $t = 0.597$). As a result, one can state that the activities directed on the mitigation of sustainability risks, despite its goodness, are unlikely to have a positive impact on the performance of the supply chain. In the case of the tourism and services industries in Karachi, the sustainability risk mitigation measures can cause an even greater problem: the increased complexity, increased cost of doing business, inconvenient regulation, and, most importantly, no business performance. On the other hand, when a business is geared towards addressing urgent operational needs and the seamless provision of the service, then the performance of the business would tend to be sub-optimally maintained at a long-term basis. In this case, the lack of risk mitigation may not be deemed as a performance driver but instead may be viewed as a periphery friction that is somewhat indirectly advantageous to the business. However, there is a possibility that the performance of the supply chain should also be enhanced along with other factors, including strategic congruence, flexible organizational structure, adaptable systems, or even resilience in an organization.

The empirical level analysis that the t-value is 0.119 and the p-value is 0.905 contradicts and negates the prediction that the relationship between the two variables, i.e. the relationship between the resilience strategies and the effective operation of the supply chain, will be positive. This reveals that the frameworks/strategies of resilience do not have a positive influence on the performance with the perspective of the used strategies. It can be concluded that the resiliency strategies of remaining, buffering and contingency planning can moderate deteriorate some performance dimensions of the tourism and services supply chain of Karachi because it can

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increase the operating cost and reduce the efficiency. The whole of resiliency strategies can be done in fragmented, ad hoc and or reactive ways. This phenomenon with a feeble, positive, incremental contribution to the overall performance of the supply chain reiterates that unless the resilience strategies are accompanied by processes of the organization, the technology, and the impetus of the strategies, this will not be achieved. Hence, most likely, this is one of the reasons why resilience strategies, in, at least, a positive dimension cannot be visible in the short term.

The null hypothesis can be given because there appears to be no statistically significant correlation between the performance and the supply chain resilience ($p = 0.081$; $t = 1.747$). The high degree of resilience did not result in higher degree of performance despite existence of correlation that was almost statistically significant. The investments towards resiliency (redundancy, adaptability and flexibility) may be overridden by a negative erosion in cost, speed or the level of service performance of the tourism and service oriented supply chain of Karachi. The service and resiliently defiant Karachi based service supply chain performance can be enhanced by the prematurely available performance of the tourism oriented service supply chain. The fact that the negative relationship is negative is an indicator that the resilience might not be efficient within the operation to absorb some of the stability and risk. Therefore, in Karachi tourism and service supply chain, it is probable that supply chain resilience would be significant in the long-term survival of the chain and not in the immediate performance enhancement of the chain.

The data confirms that the positive effect of the accomplishment of the hypothesis will be the importance of the decreased risk of sustainability and measures of resilience ($p = 0.000$; $t = 86.565$) which presupposes with the growth of the positive correlation. This affirms the fact that the sustainability on supply chains is minimized by the implementation of techniques of resilience risk. The proactive operational disruption of the processor allows the tourism and service sectors in Karachi to implement the proactive risk assessment, supplier diversification, operational flexibility, contingency planning and socially, environmentally and operationally responsive planning. The resilience measures enable the organization to be responsive to the stakeholders and the regulatory policies to be reactive to operational disruption and to focus to the sustaining risk to enhance the preparedness and adaptive capability of the sustainable risk of the supply chains such that the measures of resilience are the sustainable risk of the supply chains

5 Conclusion and Recommendation

5.1. Conclusion

The primary goal of this research was to examine how resilience strategies can be responsible of enhancing the performance of and reduce the sustainability risk of the tourism supply chain in Karachi, Pakistan. This study was formulated because there is more exposure of the supply chains to disruption resulted by sustainability issues and no empirical evidence in the developing nations. Thus, the key objectives of the research were to identify the correlations between resilience strategy, supply chain performance, minimized sustainability risk and supply chain resilience. It is argued that when the Dynamic Capability View (DCV) theory is applied, Resilience strategies and

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capabilities can help organizations to recognize, understand and adjust to uncertainty in the environment that they operate in the supply chain. The hypotheses were tested using the quantitative approach. The primary respondents were the supply chain of the Karachians hotels, transport, and logistics; hence, it was primarily concentrated on their respondents. The respondents were to answer statements on a 1-to-5 scale using a structured questionnaire. To test construct and internal consistency of the measuring instrument, pilot test was performed where 50 responses were analyzed through use of SPSS. After the pilot study had been conducted, the extra data was gathered in the main study. Data were filtered following the pilot stage on missing value, outliers and normality. I did the structural equation modelling (SEM) Evaluation of Measurement and Structural Models using SmartPLS which facilitates stronger testing of research hypotheses. Test outcomes were not the same as the reality. The hypothesis (H1) will be accepted when the relationship between resilience strategies and mitigation of challenges of sustainability is positive and significant. The same can be said about H2, which examined how failing to consider sustainability issues affected the performance of the supply chain. Also not supported was the third hypothesis which was also, H3, which was the positive relationship between resilience strategies and the performance of the supply chain. On the whole, H4 was also not supported that examined the relationship between the resilience and the performance of the supply chain. The strategies of resilience help lessen the risks of sustainability, however, there is a possibility that in the context of the present research, strategies of resilience may either have a positive or a negative correlation with the performance of the supply chain. The current research is also an extension of the developing nation setting of the implementation of the Dynamic Capability View to the sustainability risk management and supply chain resilience in theory and practice. The research is of a priceless input to policy makers in Karachi, resilience to sustainability risk of supply chain, and feasible insights to tourism industry and supply chain management. The research will be useful in the existing knowledge as it will provide information in what has never been previously compared and studied and therefore it would be of assistance in future research and also an avenue upon which robust and sustainable supply chains can be developed.

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5.2. Recommendations

It can be inferred that the empirical findings of the study have many implications to practice by managers. To the extent of working on context-specific resilience plans, as demonstrated by H1 to be assisted by these strategies, and possibly even alleviate to sustainability risk, supply chain managers in the tourism sector in Karachi, must come up with plans at the firm level. Companies need to shift to a more proactive risk evaluation as regards to the four aspects of the environment, social and operational sustainability, along with the diversification of suppliers, flexibility of operation and contingency planning. The strategies aid in enhancing the resilience of a supply chain and reducing the vulnerability to disruption.

The lack of sustainability risks does not make a supply chain more functional (H2 rejected), so the managers should not expect sustainaibility-related initiatives to deliver immediate outcomes in terms of performance. The companies need to strike a balance between the cost of operation, level of service, strategic and efficiency objective and the sustainability risk mitigation plans. To come up with sustainable operational processes, the firms need to incorporate a risk mitigation strategy as well as sustainable processes.

The invalidity of H3 and H4 implies that the companies need to improve the quality of their execution in terms of resilience. This means that the performance of the company will not improve in the short-term, as the resilience strategies and supply chain resilience have been implemented. Cross-functional teams should be created, more transparency should be achieved with the help of digital technologies, and the investments made into the resilience should be more closely linked to the performance results. Training programs facilitate changes in organizational resilience capabilities by government and trade associations into performance improvements that are measurable.

5.3. Future Directions

The provided work may be improved through the further development of the research in different respects. Most importantly, the supply chain firms in Karachi were the only source of the data; therefore, the results may not be extrapolated to the other cities. Future research has a chance of improvement because of the external validity because it involves a comparison with the completed research in other countries or increase in the study to the other large cities or regions in Pakistan. Secondly, the sample size is very small in spite of the fact that the methodology followed is satisfactory. The sample size can be expanded to provide the analysis with a higher statistical power and could also reflect other correlations between the variables of interest.

Also, a cross-sectional study design was used to collect the responses. The study needs to be conducted in the future using a longitudinal study design to measure the effectiveness of the supply chain performance of resilience strategies and sustainability risk mitigation over time. The research needed in the future should consider a broader group of variables than the given research that was narrow and only a few were studied. Lastly, the research design of mixed methods might enhance the knowledge on management and contextual challenges of the resilience and performance of supply chains in developing nations.

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